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CLAIMS

1. A substrate processing method that
exposes to an atmosphere including hydrogen radicals
5 and hydrogen ions a substrate for an electronic
device on which substrate a semiconductor device is
formed,

wherein the hydrogen radicals and the
hydrogen ions are formed by exciting a processing
10 gas including a noble gas and hydrogen by a plasma.

2. The substrate processing method as
claimed in claim 1, wherein the atmosphere including
the hydrogen radicals and the hydrogen ions includes
15 heavy hydrogen radicals and heavy hydrogen ions.

3. The substrate processing method as
claimed in claim 1, wherein the plasma is formed by
microwaves.

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4. The substrate processing method as
claimed in claim 1, wherein the plasma is formed by
emitting microwaves from a planar antenna.

25 5. The substrate processing method as
claimed in claim 1, wherein the semiconductor device
includes a MOSFET.

6. The substrate processing method as
30 claimed in claim 1, wherein the substrate for the
electronic device is one of a Si substrate, a SiGe
substrate, and a glass substrate.

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7. The substrate processing method as claimed in claim 5, wherein the MOSFET includes one of a thermal oxide film and a thermal nitride film as a gate insulation film.

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8. The substrate processing method as claimed in claim 5, wherein the MOSFET includes a gate insulation film formed by one of plasma oxidation, plasma nitriding, catalytic oxidation, catalytic nitriding, CVD, and PVD.

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9. The substrate processing method as claimed in claim 1, wherein the semiconductor device includes a storage element using a high dielectric insulation film as an interelectrode insulation film.

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ABSTRACT

In a substrate processing method that
exposes to hydrogen radicals (including heavy
5 hydrogen radicals) a substrate for an electronic
device on which substrate a semiconductor element is
formed, the hydrogen radicals are excited by plasma
formed by emitting microwaves to a planar antenna.

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